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Abstract

The making of environmental policies is a multi-stakeholders process where actors often hold antagonistic interests. The paper explores how institutional compromises are reached by the mechanism of collective *bricolage*. Recent studies are developing a view on institutional innovation as *bricolage*, but the conditions under which *bricolage* occurs and succeeds in relation to institutional innovation are still unknown. Drawing on the notion of platform developed in the context of economics performativity, we study their role in *bricolage* mechanisms. We hold an empirical case study of the GETS platform that was instrumental in developing the European carbon market as a corner-stone of European climate policy. Based on the GETS case study, we find three modalities in which platforms stimulate institutional *bricolage*: catalyzing combinations, managing learning, fostering compromise. These findings draw on, and extend, the notion of platforms developed in the context of economics performativity, contributing to a better understanding of processes of *bricolage* and, more widely, of institutional innovation. The managerial implication of this study is to identify the conditions under which compromises become manageable in processes of policy making.

Keywords: Institutional *bricolage*, innovation, platforms

Introduction

According to recent work, endogenous processes of institutional innovation are underpinned by continuous re-combinations of resources at hand in the institutional context (Carstensen, 2011; Garud and Karnøe, 2003; Højgaard Christiansen and Lounsbury, 2013; Leca and Naccache, 2006). Such processes have been labeled *bricolage*, a concept that makes reference to the anthropologist Claude Lévi-Strauss (1962; 1966) who introduced the notion in social sciences. Institutional scholars have since then used the concept of *bricolage* rather descriptively to explain compromises in institutionalization processes (Glynn, 2008; Højgaard Christiansen and Lounsbury, 2013). They all conceptualize *bricolage*as a process that unfolds "naturally", offering little insight into the causes, mechanisms, and conditions that are characteristic of *bricolage*. Our objective is to begin to unpack the black box of *bricolage* by identifying the conditions under which *bricolage* is stimulated, or even deliberately provoked. A better understanding of the conditions for bricolage can enhance the conceptualization of processes of institutionalinnovation. It also has managerial implications to the extent that it highlights conditions of successful *bricolage*.

Our orientation builds on the notion of platforms that Muniesa and Callon (2007) developed in the context of economic performativity. The research stream on economic performativity identifies "experimental moments" during which economic models are incarnated into material arrangements and subsequently assessed. In an attempt to conceptualize these experimental moments, Muniesa and Callon (2007) distinguish between three ideal typical experimental configurations: laboratories, in vivo experimentations and platforms. One of them, the platform configuration, is particularly favorable to "surprises" and *bricolage* because of its openness and flexibility (Ciborra, 1996; Muniesa and Callon, 2007). Muniesa and Callon's work of platforms provided an interesting framework to further

analyze the conditions under which *bricolage* occur. We extend their work into the realm of institutional innovation.

Drawing on an empirical case study, we explore the role of the GETS platform, a particular platform that was used in 2003 to develop the European carbon market. This platform was originally launched in 1998 by the European electricity sector, which used it to host interactions among multiple stakeholders of carbon markets and to develop a prototype for carbon markets. Using the GETS platform, the electricity sector invited members of the industry and the European Commission to engage in collective *bricolage* on carbon market prototypes. Different prototypes were crafted, experimented with, and evaluated, finally producing a prototype that fitted the requirements of every stakeholder. We use the GETS case study to identify the conditions that favor *bricolage* inside platforms.

The contribution of the paper is threefold. First, we contribute to a better understanding of institutional innovation in neo-institutional theory by conceptualizing the role of platforms and *bricolage* in innovation processes. We find that platforms stimulate *bricolage* in three ways: catalyzing combinations, managing learning, fostering compromise. Catalyzing refers to the stimulation of recombining activities. Managing learning refers to the experimental conditions that enabled to learn on the desirable designs of carbon markets. Fostering compromise refers to the collective agreement on a collective evaluation framework. Second, we clarify the status of *bricolage* in innovation processes and thus contribute to the literatures on *bricolage* and innovation management. Third, we provide empirical evidence for Muniesa and Callon's (2007) framework of economic performativity through our empirical description of the platform configuration and simultaneously extend their work to the institutional realm.

Theoretical Context

An original understanding of institutional innovation is currently being developed in the context of neo-institutional theory. Recent studies have built on the notion of *bricolage* to describe endogenous processes of innovation (Carstensen, 2011). Nevertheless, all these studies evoke the notion of *bricolage* as an *ex post* explanation of innovation. They do not target for analysis the process of *bricolage*, but simply present it as a naturally occurring phenomenon that is well suited to describe innovation mechanisms. The conditions under which *bricolage* occurs, and how it relates to institutional innovation,are left aside, which restricts the analytical potential to superficial analysis and masks the relational and cognitive dynamics of institutional innovation.

As for the role of platforms in institutional innovation, a few authors have proposed that protected spaces might play an important role in processes of institutional innovation (Guérard and Siedl, 2013; Zietsma and Lawrence, 2010).These studies emphasize the impact of the *loci*in institutional processes. Nevertheless, they barely offer any insight into conditions that these spacesprovide to stimulate *bricolage*. We extend this line of inquiry by further exploring platforms as a particular condition for *bricolage* and hence for institutional innovation. We build on Muniesa and Callon's (2007) work on performation spaces to investigate the role of platforms in stimulating *bricolage*.

Insights on institutional innovation

Institutional innovation and bricolage

An increasing number of studies conceptualize institutional innovation as the on-going recombination of resources at hand in the institutional environment (Swidler, 1986; 2000; 2003; Leca and Naccache, 2006; Zietsma and Macknight, 2009). *Bricolage* produces original associations thaterode taken for grantedcategories and institutional boundaries (Rao, Monin

and Durand, 2005). The use of *bricolage* in neo-institutional theory depicts innovation as an incremental process that involves recombination of almost anything that is present in the institutional context: residues of an old institutional order (Zietsma and Macknight, 2009), cultural elements such as symbols and logics (Højgaard Christiansen and Lounsbury, 2013), calculative tools and devices (Arjaliès, 2013; Déjean*et al.*, 2004), narratives and metaphors (Suddaby and Greenwood, 2005; Slager*et al.*, 2012); and shared culture and meanings (Hargadon and Douglas, 2001). These studies envision the institutional context as a toolkit, from which designers may pick up elements at will. They agree that new institutions arise through continuous reshuffling of old institutional elements. More recently, neo-institutional scholars have used the concept of *bricolage* to qualify such recombining process (Boxenbaum and Rouleau, 2011; Cartel, 2013; Garud and Karnøe, 2003; Glynn, 2008; Højgaard Christiansen and Lounsbury, 2013).

Introduced by Levi-Strauss (1962; 1966), the concept of *bricolage* qualifies a quite singular way of acting that results in the production of novel arrangements. Since Levi-Strauss' seminal writings (*Ibid.*), the notion of *bricolage* has increasingly been mobilized within organizational studies to characterize innovation situations and practices (see Duymedjian and Rüling, 2010 for a detailed review of the concept of *bricolage* within the management and organizational studies). Four main characteristics of *bricolage* have taken shape since the concept was borrowed and adapted from the work of Lévi-Strauss. First, the nature of the resources used consists of often obsolete objects and residues that are not associated with traditional robust innovation (Baker *et al.*, 2003). Second, the resources are often diverted from their original use to acquire new meanings and identities for which they were never intended when they were designed (Baker and Nelson, 2005; Ciborra, 1996). Third, the design process is rather distributed, unpredictable, complex and unplanned (Ciborra, 2002; Garud and Karnøe, 2003). Eventually, it seems that the project of *bricolage*

can be used to foster compromise between actors that are driven by heterogeneous, sometimes antagonistic, logics rather than to generate robust or original solutions to specific problems (Højgaard Christiansen and Lounsbury, 2013).

The role of protected spaces in institutional innovation.

Recently, a few studies have emphasized the importance of "location" of institutional creative work. The place where innovation "takes place" is not trifling. To the contrary, it seems to impact both organizations' ability to innovate and the result of the innovation process. Guérard and Siedl(2013) have used the notion of *protected spaces* to refer to places where organizations develop divergent frameworks without risking controversy. Away from prying eyes, organizations are free to engage in controversial projects. Zietsma and Lawrence (2010) reveal the importance of experimental spaces where organizations undertake experiments separated from day to day activities. In experimental spaces, organizations assess the social acceptability, i.e., the potential legitimacy, of new ideas or concepts. This paper explores whether secret experimentations offer a favorable condition for bricolage. If so, secret experimental spaces may be a key for success in institutional innovation initiatives. Typically, such secret experimentations are hosted inside platforms, so to say places that gather multiple stakeholders toward an experimental prototype.

Integrating platforms into the equation

Muniesa and Callon (2007) conceptualize different experimental configurations where economic experiments take place. Such experimentations have been found to be instrumental in institution building, so to say, the making of institutions that are supposed to transpose economic theory such as carbon markets (Guala, 2005; 2007). They make it possible to test the conditions under which theoretical concepts are transposable into innovative institutional frameworks or policies (MacKenzie, 2003; 2004; 2007).

Research indicates that platforms are particularly favorable to *bricolage* processes (Ciborra, 1996; 2002; Muniesa and Callon, 2007). In Muniesa and Callon's (2007) framework, the platform refers to a space thatis more open toward the outside than, for instance, the laboratory as Latour describes it (Latour, 1987; Latour and Woolgar, 1979, Participants – their role and nature – are likely to evolve over time, and to join the experimentation. A platform configuration enables new forms of interactions, in particular, hybridization and confrontation of different domains of knowledge, competences and interests. The platform configuration enables the testing of objects that are more complex and closer to "real economic objects" than the laboratory. Demonstration in platforms consists in achieving a compromise – shared understandings and expectations –among the participants rather than in creating robust disruptive innovation.

We borrow the notion of platform from the work of Muniesa and Callon (2007) and introduce it into the analysis of institutional innovation, as a way to explore the conditions that stimulate and favor *bricolage*. Our research question unfolds as follows: What are the conditions platforms uniquely offer that stimulate and provoke *bricolage* during policy making.

Method and data

Field settings

The European emission trading scheme (Eu-ETS) is the first and largest carbon marketin the world. It was enacted in 2003 and is now providing the basic framework for the construction of new carbon markets all over the world. The origins of this trading scheme are not well known. Yet, as pecific initiative has played a considerable role in the making of the Eu-ETS but it has been forgotten and is not part of the official story. Apart from a few experts and a handful of scholars (Braun, 2009; Skjaerseth and Wettestad, 2013) that barely cite it, the

GETS initiative remains unknown. Either it never entered collective memory or it rapidly faded from it once the Eu-ETS was formally established.

Instead there is an official story that formalizes the creation of the European carbon market (Ellerman, Convery and De Perthuis, 2010). In this story, economic theory on cap and trade instruments was developed in the 1970thby a group of economists (Coase, 1960; Crocker, 1966; Dales, 1968; Montgomery, 1972). It provided the intellectual background that drove the European Commission in its strong institutional entrepreneurship to implement carbon markets in Europe against a carbon tax (Convery, 2009; Convery and Redmond, 2007; Christiansen and Wettestad, 2003; Wettestad, 2005; Skjaerseth et Wettestad, 2008).

Oddly enough, in light of this official storyline, the Eu-ETS directive is characterized by design heterogeneity. A close reading of the European carbon market directive suggests that it borrowsheterogeneous elements from three different institutional repertoires: environmental, economic and managerial spheres. These elements are apparently combined through *bricolage:* the document is literally invaded by managerial language (e.g., projects-based mechanisms; credits; monitoring and reporting system; energy-efficient technologies), economic locutions (e.g., cost effective functioning; banking) and environmental jargon (e.g. greenhouse gas concentrations; IPCC targets), which are firmly intertwined with one another..

Clearly, the official story that presents the directive as the product of linear transposition of rational economic paradigm fails to explain the *bricolage* aspect of the directive. This misalignment suggests that *bricolage* may have been at play in the elaboration of the directive, yet this feature, and the historical events and protected spaces that produced it, have been eliminated from the official, legitimate story of how the European carbon market directive came into existence.

Toward an enriched story of the Eu-ETS: the forgotten role of the GETS platform.

Few studies in social sciences have analyzed the collective inquiry on carbon markets that has emerged after the Kyoto Protocol. Starting around 1998, alongside the effort of the European Commission to design a viable carbon market, intense collective inquiry was organized by different European actors including companies, governments, economists and NGO's (Braun, 2009; Callon, 2009). Among these initiatives, the most famous are the carbon market prototype experimented by the energy company British Petroleum at the company level and the Climate Change Levy imagined by the United Kingdom at the national level(Christiansen and Wettestad, 2003; Ellerman and Butchner, 2007; Zapfel and Vaino, 2002). During this "experimental moment" in the wild, alternative designs of carbon markets were generated and negotiated inside platforms (Callon, 2009; Wettestad, 2005).

The GETS platform was one of them. GETS stands for Greenhouse Gas and Electricity Trading Simulation. The GETS initiative was launched in 1998 by the European electricity sector to simulate and anticipate the effects of carbon markets. The sector gathered and created a working group on climate change dedicated to the making andassessment of different prototypes of carbon markets. The working group progressively enrolled all the main stakeholders of the current European carbon market: the industry members cited in the European Commission's green paper on emission trading, as well as representatives of the European Commission working group on climate change. Despite the theoretical infinity of designs that carbon markets could have taken, the prototype that the GETS platform members finally agreed on is exactly similar to the directive 2003/87/EC that was enacted by the European Commission two years later. Nevertheless, there are absolutely no traces in the scholarly literature, nor in the professional literature that restores the importance of the GETS platform in the making of the Eu-ETS. Building on the idea that secret spaces play a role in processes of institutional innovation, we began collecting data to reconstitute the GETS

episode and learn more about the effects of the platform in the institutionalization of the Eu-ETS.

Data collection

We conducted an in-depth longitudinal case study analysis covering a 5-year period from the "preparatory phase" of Kyoto in 1997 to the EU-ETS implementation in 2003 (Pettigrew, 1990). The data were collected over three years, from December 2009 to June 2012.We collected two bodies of data.

Archival research. First, we collected archives of both the GETS simulation (e.g. internal documents such as personal mail archives, companies' internal reports and external documents such as Eurelectric's official position papers, GETS simulation reports) and the European Emission Trading Scheme directive (e.g. draft projects, green papers, white papers, the written accounts of the European Commission's stakeholder meetings). These documents provided us with valuable information on (1) the *bricolage* activities undertaken in the GETS platform for the duration of the GETS experiments; (2) The co-evolution of the GETS experiment and its institutional context.

Interviews. We supplemented the archival research with interviews with both the actors of the GETS and the main stakeholders of the making of the Eu-ETS. We were particularly interested in the role each actor played in the crafting, trial and the evaluation of the carbon market prototypes that were designed on the GETS platform. We investigated what their strategic positions towards carbon markets were and how they werereflected into the prototypes design.We held 18 semi-structured interviews with these actors. We distinguish between three types of actors: (1) the leaders of the platform (The members of Eurelectric's working group on climate change and an expert from the international energy agency); (2) participants to the role play (representative of the electricity companies that participated, the representatives of industrial companies and financial institutions that participated); and (3)

external contributors (A member of the group on an emission trading scheme at the European Commission and other economists and experts in view at this moment).

Among the organisers of the role play, we interviewed two members of Eurelectric: (1) thehead of Eurelectric's working group on climate change, who, since he had been in charge of the dossier on the liberalisation of the electricity sector at UNIPEDE, had become "a devoted supporter of market instruments" (Scowcroft, 2012); and (2) a member of the working group, representing an electricity company, who had acquired special skills in modelling during his PhD. From the International Energy Agency, we interviewed a young economist specialised in emission trading, who was in charge of supervising the GETS simulation. From ParisBourse stock market, we interviewed a young trader interested in the developments surrounding environmental markets. Our questions were oriented into mainly five directions: their role in the platform, what they learnt during the GETS; what were the different possible alternatives for the carbon market design and how they selected them; We also asked about the position of the other platform members toward the design of the platform.

Among the participants to the role play, we interviewed representatives of each sector involved – electricity, industry, financial –, in order to compare their strategic positions and expectations with regard to carbon markets and the evolution of these positions over the course of the experiments. We interviewed the head of climate policy at Electricité de France[1]. From the industry, we met the person that was in charge of sustainability issues at Lafarge[2]as well as two members of the paper industry. From the financial sector, we interviewed the former head of climate policy atNatSource, an asset management services provider for environmental markets. He was in charge of defending the financial sector's participation in the EU-ETS as the sector's participation in a European carbon market was

[1]Electricité de France is the French leader in the electricity sector
[2]Lafarge is the French leader in the cement sector

controversial. We asked them if they had made propositions to the design of the carbon market prototype, what they learnt during the role play, and what were the crucial elements that made them prefer one specific design better than another.

As regards the main stakeholders who were not directly involved in the experiments, we interviewed a member of the team in charge of the Eu-ETS Dossier at the European Commission, to understand the nature of the relations between the EC and the electricity sector. We also interviewed two carbon economists and one member of the French industrial think tankon sustainable development "Entreprises Pour l'Environnement" (EPE), who enriched our understanding of the events that led from Kyoto to the enactment of the EU-ETS. These actors are well known for the role they played during the institutionalization phase of the Eu-ETS and we wanted their opinion on the role that GETS played during the process.

Data analysis

We analyzed our data in three steps. First, we used both the written archives and the interviewees to build a narrative of the GETS episode and anchor it into its global institutional context (Langley, 1999). This first contact with the data gave us insights into the controversial issues that were debated, allowed us to identify key events and provided background knowledge about both the experiment and its institutional context. The chronology we produced at this first step is represented on figure 1 below.

Insert Figure 1 about here

Second, we conducted and open coding on the data, tracing evidences of *bricolage*. For the coding, we used only the written archives of the GETS simulation that would provide a more neutral source and less corrupted by time than the interviewees. Indeed, we feared that the

people we interviewed had rationalized their story too much as we interviewed them ten years after the facts. To trace instances of *bricolage*, our open coding was organized toward the three elementary activities of *bricolage*: crafting, trial and evaluation. The coding provided considerable codes. A typical instance of trial would be the following: "*Faced with these goals and constraints each VC was able to determine its own objectives and the strategy to reach them, but had to adjust this initial strategy in line with changes in parameters such as prices of raw materials and fuels, and in the electricity and CO2 markets*"(GETS 2 report, p17).

Third, we recoded the data gathered by the previous open coding to analyze the role played by the platform configuration in the *bricolage*. We regrouped the first order codes into more abstract second-order themes based on identifying common features using iterations of data examination and emerging theoretical insights (Corbin and Strauss, 2008); subsequent iterations resulted in three third-order themes. For instance, the following first order code "*these individuals did not participate on behalf of their companies, but via so-called virtual companies, which did not necessarily bear any resemblance with their parent company*." **(**GETS 2 Report, p14) was classified under the second order code distancing, and further classified into the third order code *abstraction effort* as it unfolds in figure 2 below.

Insert Figure 2 about here

We eventually obtained three categories of roles played by platforms in processes of institutional *bricolage*: catalyzing combinations, learning management and mediating between the *bricoleurs*.

Secret bricolage on the GETS platform

This section provides a chronological narrative of the two cycles of *bricolage* that occurred on the GETS platform.

Cycle 1: The GETS platform was launched in 1999 by EURELECTRIC (The European association for electricity companies). EURELECTRIC created a steering committee for the GETS platform that gathered scholars in economy, applied economists, actors form the French stock exchange and utilities.

Crafting a carbon market prototype. The Steering Committee collectively crafted a set of rules to organize carbon exchanges. A simple example of rule is the one that sets the value of a carbon quota to 1 tone.

Trial of the carbon market prototype. The steering Committee invited the utilities to perform a role play using the prototype. Participants created a virtual profile and engaged in trading on the exchange device provided by the French stock exchange in order to reach their carbon constraint.

Evaluation of the prototype. Following the role play, the sector was convinced that markets instruments were more advantageous for them than taxes, originally preferred by the Commission. The objective was to convince the rest of the industry, that was still hostile to carbon markets.

Cycle 2: The GETS steering Committee invited all the industry members to join the GETS platform, as well as the economists in charge of the dossier at the European Commission.

Crafting three alternative prototypes. The members of the industry were invited to re-craft the prototype that had been elaborated previously. The collective re-crafting led to three different prototypes.

Trial of the three prototypes. In order to test the three alternative prototypes, three role plays were performed.

Evaluation of the alternative prototypes. The members of the steering Committee (organizers and guests) converged on one alternative that was favorable regarding all the different criteria of the stakeholders.

Findings

Catalyzing combinations

Mediating between knowledge from divers statuses

Our coding revealed that the prototype associates very heterogeneous bodies of knowledge that don't share the same status: theoretical, profane, managerial. For instance, the first prototype integrates in its design economic theory, managerial knowledge on the functioning of stock exchanges and profane knowledge on abatement costs.

Mediating between actor's expectations

The different tools, rules and devices that are integrated to the design of the carbon markets prototypes reveal the expectations of the *bricoleurs*. For instance, the addition of project mechanisms is typically representative of the expectations of the industrial sectors that seek to achieve low cost emissions. To the contrary, the rule that limit the flux of permits from project mechanisms were proposed by economists from the European commission.

learningmanagement

The trial of the different carbon market prototypes was not organized directly in the real world but inside the GETS platform. Before the trials, considerable effort was made to create appropriate conditions for the simulation. This effort is perceptible through the multiplication of equipment, management tools and models designed and set up to support the simulation.

The coding revealed that the experimental settingis in tension between two requirements: on the one hand, the experimental setting should be realistic enough to ensure serious

participation by companies', as well as the transposition of the results in the real world.On the other hand, the experimental setting should be abstract enough to enable actors to take distance from theirshort term interests to enable exploration. The organizers of the simulation (Eurelectric, the International Energy Agency and PricewaterhouseCoopers) made considerable efforts to set up experimental conditions that filled perfectequilibrium betweenrealism and abstraction.

Realism effort on the platform

The effort to set up experimental conditions that are realistic enough is identifiable through the details of the organization of the simulation. By details we understand the models, equipments and actors gathered. These organizational details fall into three categories: the ones that mimic real conditions; the ones that create equivalences with real conditions, and the ones that legitimate the societal importance of the trial.

Mimicking real conditions. To mimic real conditions, the organizers of the trial decided to borrow a real trading platform to perform the simulation. Euronext – the former French stock exchange – lent its trading platform during the empty hours to the organizers. The organizer also mandated a consulting company in charge of creating models and tools that reproduce real conditions. For example, a sophisticated model coupled with an algorithm was created to simulate the evolution of raw material prices and randomly introduce price anomalies such as the ones real actors face in day to day operations. In the second simulation, financial institutions were invited to participate to the simulation as they would probably be an important actor of the forthcoming carbon market.

Creating equivalences. The creation of equivalences was used when models and tools were insufficient to reproduce real conditions. For example, the time scale of the simulation and the time scale of a real market were made comparable by creating a transposition table. As a

result, each simulation was spread over 4 or 5 sessions […] with each year simulated over one hour.

Insert Figure 3 about here

Linking with recognize institutions. The societal importance of the simulation was made visible through the institutional network it had developed. The main institutional stakeholders involved in the making of the European Carbon market, in particular the European Commission (policy makers, NGO's, financial brokers) were invited to take part to the trial as observers. In terms of participants, the organizers of the second trial made sure that all the potential actors of a carbon market were represented.

> "*The simulation included companies from all the sectors discussed in the Green Paper […] issued by the European Commission in March 2000*."(GETS2 :12)

The prototype was coupled with other existing institutional mechanisms such as the Carbon Development Mechanism institutionalized as one of the three flexibility mechanisms of the Kyoto protocol in 1997.

Furthermore, the mission assigned to the players during the simulation was both to reach societal electricity demand, and maximize their revenues while complying with the carbon target.

Abstraction effort on the platform

Another effort undertaken by the organizers of the simulation, that may sound antagonistic with the previous one, is the effort to set up abstract (rather "unrealistic") experimental conditions. Such effort is recognizable to the impressive accumulation of tools, devices and

organizational fdetailsthat are put in place. The coding revealed three categories of abstraction efforts: distancing; theorizing; purifying.

Distancing. Distancing refers to the effort undertaken to invite actors (organizers, players) to take distance from their usual positions and interests. An instance of distancing may be found in the anonymizing of the simulation. The companies that participated to the testing didn't trade on their real names; they first endorsed virtual identity under which they could play and develop strategies anonymously.

> "*Companies were free to choose any profile they wished for their virtual companies*."(Gets 1 report, p4)

The setting of a virtual profile goes as follows: the company has to choose an energy mix. Figure 4 shows de virtual profile chosen by one of the companies renamed virtual company 1.

Once the profile is chosen, the virtual company has to calculate its yearly emissions and then comply with the overall emission reduction objective set up by the organizers of the role play.

Distance on the results of the trial was also provided by the steering Committee. The steering Committee systematically reminded the players that the price levels observed as well as the results in terms of supply and demand (so to say the usual causes of disagreement between actors)were unlikely to prejudge reality.

> "[…] *in a real-world emission trading system under the Kyoto Protocol, would probably deliver different results in terms of supply and demand, price levels, and production strategies*." (Gets 1 report, p32)

Theorizing. Considerable effort was been made to re-create the theoretical hypothesis under which cap and trade markets function perfectly. Neo-classical conditions for perfect market were reproduced (atomicity, symmetry of information, fair access to the market). Atomicity

was provided by increasing the number of players from the first to the second simulation; Measures were taken to ensure the symmetry of information such as the setting of an artificial institution dedicated to information reporting and sharing. Fair access to the market was provided by setting a trading platform where exchanges could be operated free of charge.

> "*The Gets 2 simulation managed an organised market listing of electricity and CO_2 emissions permits contracts. By organised market, we have to understand: a centralised market offering a fair access to the market, a competitive book order, and the broadcasting of information which enable liquidity and price reference set up.*" (Gets 2 report, p17)

For instance, for cap and trade markets to work well, Ronald Coase (the father of cap and trade markets) identified that there should not be transaction costs. In order to limit transaction costs, all transactions took place on the exchange.

*Simplifying*refers to the fact that real objects are too complex to support experiments. To become manageable, real objects first need to be simplified. Approximations were made for instance on electricity transported that was assumed to be free of cost. To reduce complexity, schematizations were made: two types of players only were defined (energy consumers and energy producers) and two types of markets only were in interaction (electricity and carbon). Of course, such simplifications would not stand in the real world, but they did do the job for the simulation.

> "*Overall, these minor limitations did not hinder the simulation, and in fact helped to keep it readily understandable by all participants, thereby allowing the members to design sophisticated strategies and environmental optimisation schemes*." (Gets2 report, p13)

Fostering compromise between the bricoleurs' interests

The coding revealed that four criteria were at play during the GETS to evaluate carbon markets prototypes: an economic criterion, a managerial criterion, an environmental criterion and technical criterion. To show the role of these criteria in the evaluation, we'll describe their impact on the appreciation of two features of the prototypes: the gateway system (that was introduced in the second *bricolage* episode) and the banking rule (unchanged in the two *bricolage* episodes). The gateway system is a system borrowed to the UK government that combines in the same carbon market absolute emission targets and relative emission targets. The banking rule enables a company to keep quotas in reserve from a commitment period to the other. According to this rule, a company that has reduced its emissions more than its targethas the optionto keep its excess of quotas and use it the following period instead of selling them directly on the market.

The economic criteria.

The economic criterion consists in assessing the prototypes' features according to their effects on the market performance (liquidity, quick delivery of the price of carbon, stability of the price of carbon).

For instance, the banking rule had a positive impact on the economic performance of the prototypes, in particular because it hampered the "wall effect". Indeed, a "wall effect*"* had consistently appeared at the end of all three simulations. It consistedin the apparition of irrational behaviors, abnormal transactions, patterns and prices on the market at the end of each commitment periods. When companies do not have long termtargets, they are not encouraged to develop long term coherent strategies on the carbon market and will prefer short term optimizations to maximize their revenues. Such situations would lead virtual companies to sell all exceeding allowances instead of banking them, and restrain long term investment in clean technologies. The introduction of banking had positive outcomes on the

wall effect as it artificially extends the horizon of the commitment. It is also compatible with hedging strategies that are used by electricity companies to minimize risk. Today, this argument is still very alive in international climate debates when new reduction emission targets are to be set up.

To the contrary, the *gateway system* had a negative assessment on the economic criteria. To work, the gateway mechanismrelies on sophisticated monitoring system that results in high transaction costs. Yet, economic theory suggests that market instruments are efficient under a no transaction costs hypothesis (Coase, 1960).

"*It is not certain that such a system can be implemented in all industrial sectors and it does generate monitoring costs that are far superior to those required in a standard system*." Doc2 P7.

The environmentalcriteria.

The environmental criterion consists in assessing the features of the carbon market prototype according to their "environmental integrity." In other words,to be approved, design features should not interfere with the achievement of overall emissions objective.

For instance, banking emissions from a period to the other does not jeopardize the overall environmental target. It only re-allocates the company target over the time-period of the constraint. The overall environmental integrity of emission trading was assessed and legitimized by the fact that trading is not sufficient to achieve the overall emission cap. Technology investment and production management are required to achieve the overall target.

"*Banking and grace periods would also assist compliance strategies, without a negative impact on the environment*." (GETS1 Report : 12)

To the contrary, intensity targets, that are used the gate way system, do not guaranty that the overall environmental objective is achieved. Intensity targets cap emissions according to production units. Such targets guaranty that companies revise their production models, not that they emit less. For instance, if a company emits twice less but produces thrice more, then the environmental integrity of the system is not achieved. Gateways typically can do nothing against this problem and furthermore, they make it difficult to controlexactly the levels of emission reductions achieved.

The managerial criteria.

The managerial criterion refers to the effect of a design feature of a carbon market prototype on strategy building inside companies. The managerial performance of banking was judged positive whereas the managerial performance of the gateway was judged negative.

Banking provided companies with flexibility and proved to favor investments in clean technologies in sectors where investmentcould have been less interesting than trading from an economic point of view. Indeed, investment in clean technologies results in surplus carbon credits for the company. According to the carbon price delivered by the market, it may become less interesting for a company to invest in clean technologies than, to by credits from another entity.Banking makes it possible to sell credits at the best carbon price on the following periods.

"*Virtual companies relied a lot on the possibility to bank emission permits generated in the first budget period, either to comply in the next period, or to sell for revenues, when market prices were favorable. In a sector like the power sector, the size of investment in new production is largely dependent on the chosen technology: investing in a new 300 MW combined-cycle gas turbine may deliver more low-emission generation than what the company needs to comply with its CO2 objective. Banking made it possible to*

benefit from these additional reductions, on top of the possibility to trade them immediately." (GETS1 report : P25)

To the contrary, the gateway introduced a high level of managerial complexity that was difficult to handle for virtual companies.The gateway made it difficult to obtain transparent information and global representationof the market. The companies feared that it could hamper the making of strategic decisions if implemented for real.

"The implementation of a system combining an absolute (capped) sector and a sector with index-based objectives was technically feasible but complex to interpret for the participants." (GETS2 Report: 7)

The overall performance of carbon markets, received positive evaluation from managerial criteria. Indeed, an emission trading scheme, when coupled with the recently liberalized electricity market, provided options for strategic optimization between carbon trading, electricity trading and clean technologies investments.

"*The use of a dual electricity and carbon market allowed industrial companies to optimise the economic cost of reductions in greenhouse gas emissions. For each of the three commitment periods within the three simulations, the industrial companies as a whole met their reduction objectives.*" (GETS2 report : 7)

The technical criteria.

The technical performance of the gateway was judged negative.

"*The management of the gateway has proved extremely complex in terms of monitoring. It should also be noted that gateway's management constraints were a lot more simple in the simulation than they might have been in a real market. Market conditions did not led the SO to close the gateway. Other conclusions are difficult to draw, because the*

compliance with index-based targets without creating extra permits depends on the evolution of the macro-economic conditions." (GETS2 report: 28)

Discussion

On institutional Theory

Catalyzing.

Platforms act as *bricolage* catalyzers as they confine into the same space actors from heterogeneous domains that come to share their repertoires. The platform artificially structures relations among actors that do not share the same knowledge, belief system and interests as regards the making of carbon markets. These actors are encouraged to hybridize their representations without any prejudice on the value of their propositions. As seen in the dedicated section, different bodies of knowledge are hybridized independently of their status. Profane knowledge and theoretical knowledge are fit together without any presupposed hierarchy between them. The platform abolishes taken for granted orders of merit. All the resources are brought about into a flat world within which *bricoleurs* are free to mobilize them without referring to any institutionalized knowledge on what resource should be associated together. This characteristic of the platform stimulates the variety of unexpected and even provocative combinations.

Learning.

Platforms play an important role during processes of institutional *bricolage* in the way that they enable learning. Indeed, the nature of the experimental setting is explicitly meant to provoke reality and to be the closest as possible to real conditions. Different artifacts are created in order to mimic reality such as the random introduction of "accidents" in primary energy prices and realistic models of energy demand. Equivalences were created to ensure consistency between the conditions of the simulation and reality. Such effort of organizing the

experimental conditions enable to learn things that still have value of truth outside the experimental configuration. To the contrary, an important effort is made to operate a distance between the experimental setting of the platform and real conditions. In the GETS, players are "masked". The mask provokes an epistemological switch in their collective dialogue. They are not defending the position of their organization; they are participating to a collective enquiry. Thus, the mask enables a temporary switch in the player's strategies: from individual strategies to a collective strategy. In the space of the platform, the players are facing the same uncertainties about both the nature of the object that is being designed - the output of *bricolage* -, its potential effects as well as the value propositions associated to it. Thus, they must collectively build the means to learn about what has to be learnt.

Compromising.

The platform promotes the making of shared understandings though a discussion of the results of the trial. Theoretically, infinity of possible combinations is imaginable to form a carbon market prototype. Every time a prototype does not fill all the criteria displayed by the community of *bricoleurs*, it is rejected, knowing that the variety of prototypes is not a limiting factor. Thus, in *bricolage* processes the production of shared understandings is the result of an intellectual operation that theorizes the characteristics of the prototype. It doesn't precede the materialization of the innovative concept but rather follows it.

Each criterion was defended by at least one actor of the platform. Schematically, the Economists taking part to the platform were keener to evaluate the performance of the market in economic terms, the European Commission, more on environmental terms, the industrial companies represented would advance a managerial criterion and the consulting company defended a rather technical point of view. Nevertheless, all the actors of the platform progressively familiarized with the criteria of one another. When a feature of the design meets

all criteria, it is commonly approved. Interestingly, the prototypes were evaluated both on a modular basis (feature by feature) and on a global basis (global performance).

On bricolage

In the organizational literature, *bricolage* is commonly perceived as a particular way in which actors engage in the production of novelty. Consequently, bricolage may be conceptualized as a design activity: an activity that produces innovative objects, technologies, practices or organizational forms. Nevertheless, the paper shows that *bricolage* differs from traditional design activities as its performance is not measurable by traditional innovation assessment criteria. To the contrary, the performance of *bricolage* is best captured by its ability to foster compromise between a community of designers.

Furthermore, the case study reveals an important aspect of *bricolage* that has remained unexplored: its experimental dimension. Inside platforms, the *bricoleurs* rely on sophisticated experimental conditions that are central in enhancing the prototypes and promoting constructive discussions among the *bricoleurs*. Experimentation is a form of trial that involves a higher degree of reflexivity than commonly described trials.

On platforms

In the context of economics performativity, the nature of the activities that are undertaken on platforms and lead to compromising are unknown. The paper expands the understanding on platforms by exploring the *bricolage* activities they host and provoke.

Conclusion

We have studied two episodes of institutional *bricolage* on carbon markets prototypes inside the GETS platform. Our contributions are three-fold. First, in the context of institutional theory, we show that platforms stimulate institutional bricolage in three ways: they catalyze the production of provoking combinations, they protect *bricoleurs* from

institutional pressures and promote compromising on shared understandings. The platform configuration acts as an agency accelerator. Second, we expand the understanding of *bricolage* in organizations by suggesting that it belongs to an original class of design activities that value lies in compromise rather than in the originality and robustness the innovations produced. Eventually, we contribute to the literature on the performativity of economics by describing empirically the platform configuration. From a managerial perspective, the paper gives insights on unknown mechanisms of policymaking. The understanding of platforms and their characteristics has potential to enhance the making of new regulations.

Furthermore, our paper suggests that "experimental moments" play an important role during processes of institutional *bricolage*. Indeed, institutionalization processes not only consist in promoting strategically an innovation that has been previously identified and theorized, such as in the model of the institutional entrepreneur (Battilana *et al.*, 2009). It consists in exploring new options, new possible orders for collective action. Our paper shows how different possible orders are collectively imagined and experienced in platforms. It seems that collective learning is crucial to inform processes of institutional innovation. Traditionally, collective inquiry, the form of learning it conveys, is a dimension of institutional processes that is not explored. It is different from theorization (Greenwood *et al*., 2002; Strang and Meyer, 1993) as theorization may happen only as an ex-post rationalization of innovation (to highlight its strengths compared to previous situation). It seems that experimentation, that is inherent to *bricolage* may play an important role during processes of institutional innovation as originator of agency. Our findings suggest that experimentation stimulates the degree of agency involved in selection mechanisms. The role of experimentation as an originator of agency may be an interesting track to follow for the understanding of institutional innovation processes.

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Tables and Figures

Figure1. Chronology of the GETS platform

Episode	Activity	Year	GETS platform	European Commission
Episode 1	*Crafting*	December 1998	Design of the GETS device by Eurelectric working group on CC	
	Testing	March 1999	Simulation 1	
	Evaluating	October 1999	GETS 1 Report	
Episode 2	*Crafting*		Revising the GETS device	
	Testing	February 2000 April 2000 June 2000	Simulation 2.1 Simulation 2.2 Simulation 2.3	
	Evaluating	November 2000	- GETS 2 Report - Presentation of the results at the Bonn climate CoP	
Episode 3	*Crafting*	2001	Stakeholder consultation organized by the European Commission	
		2003		Adoption of the directive 2003/87/EC establishing a European emission trading system
	Testing	January 2005		Launch of the Eu-ETS
	Evaluating	2007		First evaluation and revision of the Eu-ETS

Figure 2. Coding structure for learning management in the platform

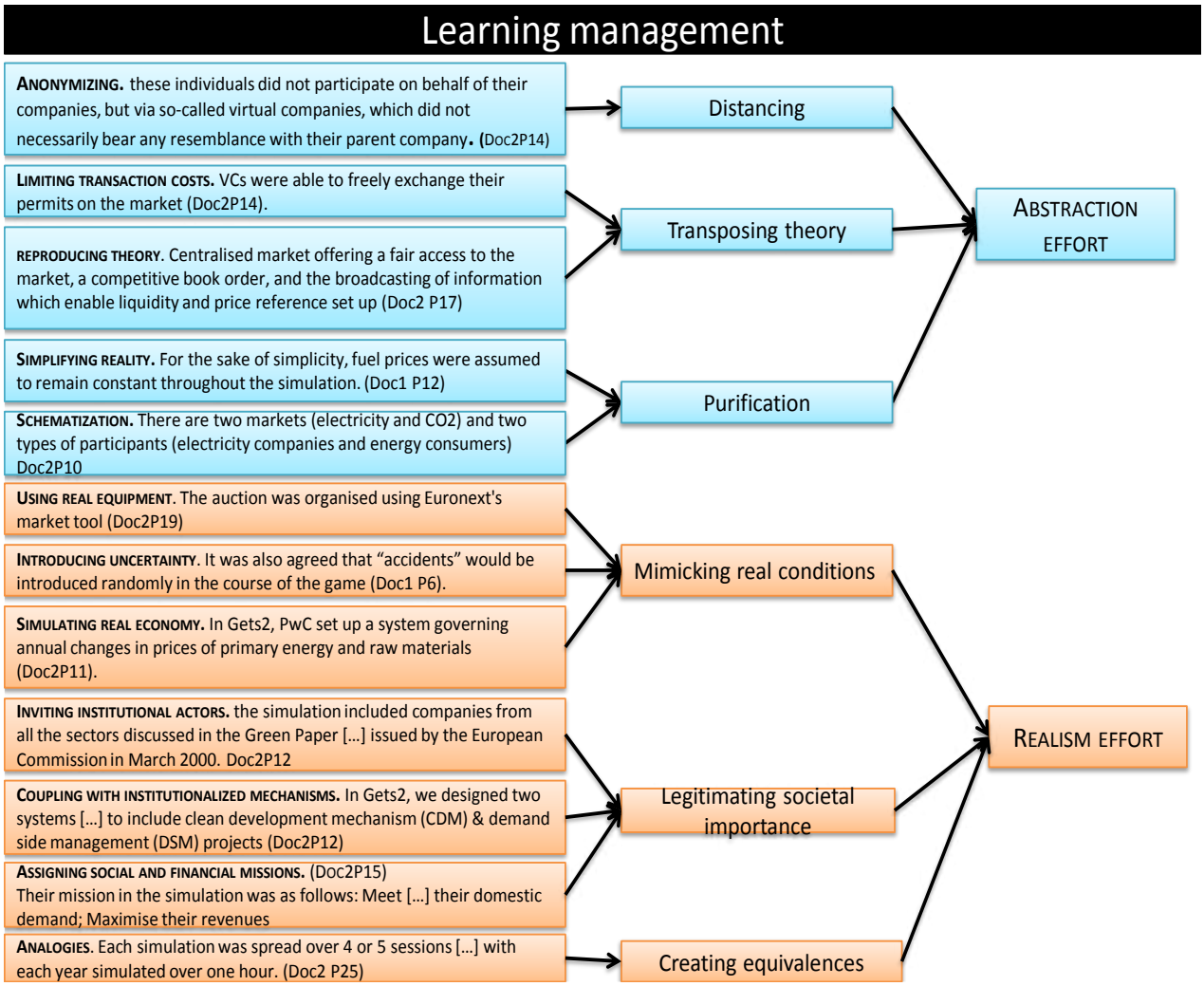

Figure 3 Equivalences between real time and platform time

8 periods, including 2 grace periods, will be simulated:

→ 2000 – 2002 (3 years)
→ 2003 – 2004 (2 years)

→ 2005 – 2006 (2 years)
→ 2007 (1 year)

→ 2008 + grace period for the commitment period 2005-2007
→ 2009 – 2010 (2 years)
→ 2011 – 2012 (2 years)

→ grace period for the commitment period 2008-2012

Figure 4: Anonymizing companies

Virtual Company	Power plants in 2000	Installed capacity	Generation in 2000	CO2 Emissions
VC 1	- Coal 520 MW - CCGT 340 MW - " " 335 MW - " " 225 MW - " " 250 MW - " " 230 MW - Wind power 100 MW	2 000 MW	9.5 TWh	5.56 Mt